REMARKS/ARGUMENTS

Reconsideration of the above-identified application is respectfully requested in view of the foregoing amendments and the following remarks. Claims 4 and 10 - 14 have been cancelled. Claims 1, 2, 5, 17, and 18 have amended. Claims 24 and 25 has been added. Claims 1 - 3, 5 - 9, and 15 - 25 remain in the case.

The claims of the instant application are drawn to a unique surgical headlamp wherein a single, centrally disposed outer housing is centrally affixed to a headband. The housing is located above the eyes of the wearer. Within the outer housing, two or more independently supported and adjustable lamp housings are mounted adjacent one another. Each independent lamp housing contains one or more LED light sources, a heatsink, and, typically, one or two reflectors. The multiple lamp housings provide independent light beams which may be converged upon a single region of interest to the surgeon or other wearer. Rechargeable batteries are provided in headband-mounted enclosures, the batteries being configured to allow hot swapping a battery (i.e., one of the batteries may be replaced while the headlamp is in active use without interrupting the light beam therefrom). The novel headlamp provides a high-intensity light field on the order of 40,000 lux.

Claims 1 - 4, 7 - 16, and 17 -23 were rejected under 35 U.S.C. §103(a) as being unpatentable over United States Patent No. 5,115,382 for HEADLAMP APPARATUS, issued May 19, 1992 to Robert C. Smith in view of United States Patent No. 6,554,444 for GAZING POINT ILLUMINATING DEVICE, issued April 29, 2003 to Jun-ichi Shimada et al.

SMITH teaches a headband having a single, centrally located lamp housing mounted in a forward facing direction thereupon. SMITH teaches a "removably mounted lamp 66, with lamp 66 preferably being an incandescent halogen type bulb." (Column 7, lines 16 - 17). SMITH fails to teach or suggest:

an outer lamp housing;

an LED light source;

a heat sink; and

a headband-mounted battery.

In fact SMITH teaches away from a headband mounted battery: "Some of these earlier head lamps were attached to headbands which had relatively heavy battery packs affixed thereto, which proved to be uncomfortable for the wearer due to the excessive weight, especially for extended usage.

Later models of head mountable lamps were structured with remote battery packs attachable elsewhere on the user, with the battery packs connected by flexible conductors to the lamp units. Although these later models constituted significant improvements over the previous structures which had the batteries attached to the headband which supported the lamp unit, they still contained various disadvantages..." (Column 1, lines 50 - 62)

SMITH fails to provide any regulation of battery output to ensure constant illumination from the LED light source. Applicant respectfully disagrees with the Examiner's statement that "normally functioning dry cell batteries will not vary in voltage." In actuality, dry cell batteries are notorious for their drop in voltage as they become discharged. A regulator per se would be inserted between the batteries and the lamp in the block diagram of SMITH FIGURE 3b. None is present. The regulator referred to by the Examiner at SMITH Column 7, line 46 - column 8, line 20 is a regulator in the battery charging portion of the SMITH circuitry, found in SMITH FIGURE 3b in the unnumbered block "VOLTAGE & CURRENT REGULATING CIRCUITRY" located prior to the batteries. This regulator has no influence on the light output of the SMITH lamp when the SMITH apparatus is powered by its batteries.

The period of time during which operation of the novel headlamp may be needed may certainly exceed the life of a dry cell battery or a rechargeable battery. Consequently, Applicant provides a design where redundant batteries are provided which, along with appropriate circuitry, allows hot swapping the batteries to provided continuous operation of the headlamp as long as freshly charged replacement batteries are available. Applicant also respectfully disagrees with the Examiner's statement that the mere connection of batteries in parallel and/or the ability to plug the headlamp into an external power source constitutes a hot swapping facility. The term "hot swap" as understood by Applicant means that a battery may be removed from device and replaced (i.e., swapped) while the devices continues to function normally (i.e., is hot) and absent an external power source. SMITH states: "the battery housing includes a power input jack to removably receive a low voltage plug and cord arrangement from a voltage step-down electrical transformer. The step-down transformer may be plugged into a standard 120 volt outlet. The transformer and low voltage cord arrangement when plugged into the battery housing is used to supplement and charge the batteries contained therein, with this supplementing and charging arrangement allowing long term extended use of the lamp if desired. By sending only low voltage, preferably around 9 volts through the removable cord to continuously trickle charge and supplement the batteries, not only may the lamp illuminate an area for an extended period of time, but the device is very safe for the user to wear when in contact with a grounded surface. My battery supplementing and charging arrangement uses known electronic circuitry, and is very similar to that used in most modern battery powered and rechargeable electric shaving razors where if the batteries run out of power half way through a shave, a charging cord may be plugged into the razor to feed power directly to the electroreceptive device, the motor in the case of shaving, and the lamp in the case of my invention to allow completion of the immediate task. With the electrical cord plugged in with the switch of the razor or my invention in the off position, the batteries are fully recharged over a period of time." [Emphasis added] (Column 3, lines 12 - 39) There is certainly

no teaching or suggestion of replacing a battery WITHOUT the battery pack being connected to an external source of power (i.e., hot swapping a battery).

There is no motivation in SMITH to create a lamp assembly using two adjustable lamp housing because the SMITH single housing is adjustably affixed to the headband so as to provide flexibility in the range of adjustment, as stated, "My invention includes a lamp assembly affixed to the headband in a manner to provide a wide range of positioning adjustability to enable the wearer to redirect the light at a desired point. The positionability of my lamp assembly is also a convenience in cramped situations such as under a car where space is limited, allowing the lamp assembly to be repositioned to avoid becoming an obstacle. The adjustability in positioning of the lamp assembly eliminates the need of the wearer to redirect the position of his head every time the direction of the emitted light is desired to be altered. The lamp assembly adjustability is provided with a double universal swivel connection which not only allows one-hundred eighty degree rotation of the lamp, but horizontal and vertical repositioning as well." (Column 3, lines 46 - 60)

Further, SMITH fails to teach or suggest an outer housing as disclosed and claimed by Applicant. Applicant's outer housing not only protects the positions of the two or more light modules from accidental maladjustment but protects the individual lamp housings contained therein from contamination by spurting blood or other body fluids which could obstruct the illumination at a very time when surgical site illumination is critical. Of course, the in-and-out telescoping focusing mechanism of SMITH would not be conducive to containment within an outer lamp housing. Consequently, SMITH also, in effect, teaches away from the important feature of Applicant's outer lamp housing as disclosed and claimed.

SHIMADA et al. teach a pair of goggles having independent, but not independently adjustable, lamp housings affixed at the outside peripheral edge of each goggle lens. SHIMADA et al. teach away from a central placement of the two

lamp housings: "it is more preferable to attach them at the left and right ends of the front face of the goggles because they make a larger cross angle of the lighting directions which provides a better shadow-free illumination." (Column 5, lines 62 - 65)

The integration of light sources and a goggle structure provides several disadvantages. First, goggles as taught by SHIMADA et al. totally cover the eyes of a wearer and may distort and/or occlude that wearer's vision. Second, the goggle/light source integration precludes use of the light source contained in the goggle structure with interchangeable lopes or other optical devices that are widely used by vascular and other surgeons.

The SHIMADA et al. apparatus features multiple LEDs 14 (FIGURE 3) mounted on a circuit board. The circuit (i.e., base) board 15 (FIGURE 3) is suspended and is movable by actuators, for example motor 18, (FIGURE 3). SHIMADA et al. fail to teach or suggest a lamp housing similar to that of Applicant as may be seen in Applicant's FIGURE 3.

Neither is any heat sink or reflector taught or suggested. This lack of a heat sink disclosure is most likely due to the presumably low wattage LEDs disclosed in SHIMADA et al.

Also, because of the lack of a reflector or other converging structure within the SHIMADA et al. lamp housing, the beam pattern is relatively uncontrolled.

In their preferred embodiment, SHIMADA et al. provided a power source external to their goggles and connected thereto by cord 8 clearly seen in FIGURE 1. Although "the battery pack may be attached to the goggles 1, in which case the cord can be omitted. Instead of using a battery pack, an AC/DC (alternating current to direct current) converter may be used." The weight of batteries necessary to power the motors of the direction changing mechanisms, the gazing direction

detection circuitry, as well as the multiple LEDs probably makes this approach highly impractical.

SHIMADA et al. are silent on the topics of hot swapping a battery and of providing regulation to ensure uniform light output from their LED light sources.

The SHIMADA et al. lamp housings 5 (SHIMADA et al. FIGURE 1) do not move; only the LED panels 15 (SHIMADA et al. FIGURE 3) mounted within housings 5 are moved my motors 16 and 19 (SHIMADA et al. FIGURE 3).

SMITH fails to provide an "infrastructure" which, through the addition of the teachings of SHIMADA et al., could establish a prima facie case of obviousness. SMITH fails to provide any suggestion of an outer lamp housing but rather, teaches a single lamp housing having an incandescent halogen bulb. SHIMADA et al. fail to provide lamp housings having heat sinks or reflectors. Neither SMITH nor SHIMADA et al. provide any provision for hot swapping rechargeable batteries located on the headband. Further, there is no motivation for combining SMITH and SHIMADA et al. for the reasons mentioned above.

Independent claim 1 has again been amended to more accurately recite the novel subject matter that Applicant considers his invention. The amendment of claims 1 and 17 are believed to overcome their rejection under 35 U.S.C. §103(a) as being unpatentable over SMITH in view of SHIMADA et al.

Claims 5 and 6 were rejected under 35 U.S.C. §103(a) as unpatentable over SMITH in view of SHIMADA et al. and further in view of United States Patent No. 4,288,844 for ELECTRICALLY FOCUSED SURGICAL LIGHT, issued September 8, 1991 to Kenneth J. Fischer et al. The teaching of FISCHER et al. is directed to a large overhead lamp system for an operating room or similar environment. An electrical switching system, in combination with lamps having multiple filaments, is used to selectively provide broad or narrow fields of illumination (i.e., "flood"

or "spot" lights) by selecting which filaments of which of multiple lamps are selected.

The FISCHER et al. arrangement effectively performs a focusing function as the multiple lamp filaments are arranged in a front-to-back manner so that the light from a particular filament is focused differently by the lamp's reflector. Selective switching of filaments within selective lamps focuses the output of the FISCHER et al. multi-lamp unit at a desired point. As discussed hereinabove, the fundamental structure of Applicant's novel headlamp is different from those of SMITH and SHIMADA et al. Adding the teaching of FISCHER et al. to that of SMITH and SHIMADA et al. still fails to teach or suggest Applicant's invention. Applicant relies on no electrically actuated mechanism to converge the beams of light from the centrally mounted independent light sources. The reflectors within Applicant's light source are fixed relative to the LED light source and to each other. In the normal orientation and adjustment, the light beams from each of Applicant's independent light sources converges at a point approximately 14" forward of the light sources. To change the point of convergence (NOT necessarily the focal point of any light housing), each lamp housing is independently moved to converge the respective light beams at the desired spot.

Applicant believes that the amendment of the claim 1 discussed hereinabove overcomes the rejection of claims 5 and 6 under 35 U.S.C. §103(a) as being unpatentable over SMITH in view of SHIMADA et al. and further in view of FISCHER et al.

As all rejections are overcome, Applicant respectfully requests that claims 1 - 3, 5 - 9, and 15 - 25 be allowed and the application passed to issue.

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(Date of Deposit)

Mark Levy, Reg. No. 29188 5/11/05
Attorney (Date)

Respectfully submitted,
MARK LEVY & ASSOCIATES, PLLC

By: _____

Mark Levy
Registration No. 29188
Attorney for Applicant
Press Building - Suite 902
19 Chenango Street
Binghamton, New York 13901
Phone: (607) 722-6600